

APPENDIX I

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QUALITY ASSURANCE SAMPLING PLAN
FOR
R6 WILCOX OIL REFINERY REMOVAL ASSESSMENT

(b) (6)

Prepared for

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1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) Contractor has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 Prevention and Response Branch (PRB) under Region 8 Contract No. EP-S8-13-01, Technical Direction Document (TDD) No. 0009/WESTON-042-17-064 (Appendix C) to provide technical support during the time critical removal action at the Wilcox Oil Company Superfund Site, located at West 221st Street South/Refinery Road near Bristow, Creek County, Oklahoma. A Site Location Map is provided as Figure 1-1. All figures are provided as separate portable document format (PDF) files. The Superfund Enterprise Management System (SEMS) Identification Number assigned to the Site is OK0001010917. Site coordinates are Latitude 35.842144° North and Longitude 96.381456° West.

START has prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work and activities to be completed as part of the TDD. START will work concurrently with the Emergency and Rapid Response Services (ERRS) contractor, Environmental Restoration, LLC., who will be responsible for excavation, transportation, and disposal of site-related contaminated soil including benzo(a)pyrene and sludge containing total petroleum hydrocarbons (TPH). Specific ERRS site-related activities will be described in their respective work plan documents.

1.1 PROJECT OBJECTIVES

START is providing general technical support to EPA for performance of the Wilcox Oil Refinery time-critical removal action. START activities include establishing on-site excavation grids; collecting post-excavation samples; performing laboratory analysis, data validation, and data management; air monitoring; and maintaining site documentation using Response Manager. In addition, written, digital, and cost documentation will be compiled documenting the removal activities.

Specific field investigation activities will include discussion of data quality objectives (DQOs), health and safety protocol, community relations, field activity meetings, command post establishment, and quality control/quality assurance.

The objective of the time-critical removal action is to remove the threat to human health and the environment posed by chemicals of concern (COCs) resulting from historical site operations conducted at the former Wilcox Oil Refinery Site, specifically related to (b) (6). The objective of the time-critical removal action will be achieved by excavating contaminated soils ranging from a depth of 0 to 24 inches below ground surface (bgs). Post-excavation soil samples will be collected by START prior to backfilling the excavated grids with clean fill material. Soil samples representing each grid will be analyzed for Semi-volatile Organic Compounds (SVOCs) following SW-846 Method 8270 - Selected Ion Monitoring (SIM). The site-specific COC is Target Analyte List (TAL) benzo(a)pyrene. The site-specific action level, as specified in the May 2017 “EPA Action Memorandum,” is provided in Table 1-1.

Table 1-1
Site-Specific Action Level
Wilcox Oil Refinery
Bristow, Creek County, Oklahoma

Analyte	Action Level ¹	Units
Benzo(a)pyrene	0.11	mg/kg

Notes:

mg/kg - milligrams per kilogram

1 – specified in the “EPA Action Memorandum, May 2017.”

1.2 PROJECT TEAM

The START Project Team Leader (PTL) position will be held by Derrick Cobb, and the Field Team Leader (FTL), Meagan Willis, will fill positions of Field Safety Officer (FSO) and Data Manager. The PTL will be responsible for the technical quality of work performed in the field, documentation of site operations, collecting confirmation soil samples, providing overall site health and safety support, and will serve as the START liaison to the EPA Region 6 On-Scene Coordinator (OSC) Steve Mason. The FTL, in collaboration with EPA OSC Mason will determine the location for sample collection in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. Data management will include entering samples collected into SCRIBE; producing accurate chain-of-custody documentation for the samples during the removal action; entering daily operations and sample collection data into the Regional Response Center–Enterprise Data Management System (RRC-

EDMS) Response Manager software; and sample shipment. START will conduct sample collection, preparation, and documentation; and document site activities in field logbooks and data sheets. The START Scope of Work Leader, Jeff Criner, will provide technical support to the START personnel during project activities.

1.3 QASP FORMAT

This QASP has been organized in a format that is intended to facilitate and effectively meet the objective of the removal action. The QASP is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methods and Data Validation
- Section 5 – Quality Assurance

All figures are provided as separate Portable Document Format (PDF) files. Appendices are attached with the following information.

- Appendix A Standard Operating Procedures
- Appendix B Data Quality Objective
- Appendix C TDD No. 0009/WESTON-042-17-064

2. SITE BACKGROUND

This section presents a summary of background information for the Wilcox Oil Refinery site including site location and description, operational and regulatory history, previous investigations, and sources of contamination.

2.1 SITE LOCATION AND DESCRIPTION

The Wilcox Oil Refinery site is an abandoned and demolished oil refinery and associated tank farm located north of Bristow, Creek County, Oklahoma. The geographic coordinates of the Site are approximately 35°50'31" North latitude and 96°23'02" West longitude. A detailed title search in the Creek County Clerk office confirms that the property was used in oil refinery operations from approximately 1915 until November 1963. The former Lorraine refinery, including associated tank farm, operated under numerous companies from approximately 1915 to 1937 when the property was sold to Wilcox Oil and Gas Company. Wilcox Oil and Gas Company purchased refinery operations on the remaining acres east of the railroad tracks and operated as a crude oil refinery from the 1920s until the property was sold on 01 November 1963. The site encompasses approximately 140 to 150 acres. A Site Area Map is provided as Figure 2-1, and a Site Property Map is provided as Figure 2-2.

The site is flanked by Route 66 to the west; a residential area and Turner Turnpike to the northwest and north; Sand Creek to the southwest; and residential, agricultural, and wooded areas to the east and south. The topography in the vicinity of the site slopes to the south. Surface water runoff would follow the topography in the vicinity of the site. There are several fresh-water ponds on the site, and some local residents indicated that, historically, fishing has occurred. Two intermittent streams drain the eastern and western portions of the site, and these streams flow south into Sand Creek.

The former Wilcox Process Area is fenced while residential and agricultural properties on the site are partially fenced with barbed wire. A chain-link fence was installed around the former Lorraine Process Area during the 2015 Phase II removal assessment.

The Site is divided into five major former operational areas: the Wilcox Refinery, the Lorraine Refinery, the North Tank Farm, the East Tank Farm, and the Loading Dock Area. These five areas are described as follows:

- The former Wilcox Refinery Area is fenced and covers approximately 26 acres. Most of the equipment and storage tanks that remained on-site in 1963 were auctioned and have been salvaged for scrap iron by private land owners, and what remains are in ruins. Four aboveground storage tanks (ASTs) (12,500 gallons each) remain standing, in addition to a number of buildings, discarded drums and pieces of scrap iron and piping. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature. A building in the northern part of the former refinery has been converted to a residence. An intermittent creek flows southward across the eastern portion of the refinery area through a small pond in the southeast corner of the refinery area and into Sand Creek.
- The former Lorraine Refinery Area covers approximately 8 acres and includes the southwestern portion of the Site, south of Refinery Road and west of the railroad. No refinery structures remain in the processing area. The First Assembly of God Church, a playground, and one residence are located here. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature.
- The East Tank Farm was a large crude oil storage area/tank farm covering approximately 80 acres and contains pits, ponds, and a number of circular berms that surrounded tank locations. All of the tanks have been cut down and removed; however, remnants of the tank locations remain and are visible. Many of the berms surrounding the pits, ponds, and former tanks have been cut or leveled. An intermittent creek is located in the eastern portion of the tank farm and flows south to Sand Creek. A pumping or gas compressor station exists in the north-central portion of the Site, and an active pipeline crosses from northwest to southeast across the middle of the Site. There are four residences located on top of or directly next to former tank locations. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature. Waste was also observed in several drainage channels that empty into Sand Creek.
- The North Tank Farm was a crude and fuel oil storage area consisting of approximately 20 acres. No refinery structures remain in the product storage area, and all tanks have been cut down and removed. Remnants of the tank locations are not visible, and historic locations are difficult to pinpoint. One residence is located in this area.
- The Loading Dock Area is approximately 7 acres and was used for loading and unloading product by rail. Just a few refinery structures/supports remain and are generally located

parallel to the existing rail lines. There are multiple areas of stressed vegetation, barren areas, and visible black tarry waste of a hydrocarbon nature.

2.2 OPERATIONAL AND REGULATORY HISTORY

A modern skimming and cracking plant was constructed in 1929. The upgraded facility had an operating capacity of 4,000 barrels of crude oil per day. The main components of the system consisted of a skimming plant, cracking unit, and re-distillation battery with a vapor recovery system and continuous treating equipment. The crude oil was brought directly from the field, eliminating storage and handling facilities, but resulting in crude oil with high sediment and water.

Sanborn fire insurance maps can be used to understand historical property usage. The Wilcox Oil and Gas Company and Lorraine Refining Company Sanborn Insurance Maps indicate that the properties contained approximately 80 storage tanks of various sizes, a cooling pond, and approximately 10 buildings housing refinery operations. The maps also indicate that crude oil, fuel oil, gas oil, distillate, kerosene, naptha, and benzene (petroleum ether) were all stored on the property.

After the refinery operations ceased and most of the tanks and buildings were demolished and sold for scrap, the property was sold to private interests. Beginning in 1975 with the construction of the church, private residences were constructed on 6 parcels of land that were part of the former refinery operations. The most recent being constructed in 2003/2004. One former building associated with the refinery was repurposed as a residence. As a result, there is a total of seven residences on the Site, all of which are located on former tank or refinery operations locations. Three of the residences located on the eastern portion of the Site are known to use water from domestic/private wells. The drainage pattern of the Site is primarily toward Sand Creek that serves as the western and southwestern boundaries of the Site. Two intermittent streams and several drainage channels cross the portion of the Site east of the railroad and flow into Sand Creek.

The refinery waste source areas of concern include a backfilled oily waste pond and pit, a breached settling pond, a former pond apparently backfilled with solid refinery waste, and a number of former tank storage areas. The contaminants of concern are metals and organic compounds (Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons [PAHs]). These potential

contaminants of concern are found in soil, sediment, and waste material.

Specifically, (b) (6) (subject to this removal action) is currently occupied by a family. During previous assessment activities, levels of benzo(a)pyrene were found to exceed the screening level of 0.016 mg/kg at depths ranging from 0.0 inches bgs to 24 inches bgs. No other SVOC or TPH exceedances were reported for (b) (6).

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Multiple investigations have been performed on the Site since 1994. These documents were used to summarize the Site background and operational history described above.

- Preliminary Assessment (PA) was performed at the former Wilcox Refinery Site by the Oklahoma Department of Environmental Quality (ODEQ) in December 1994.
- Expanded Site Inspection (ESI) was performed at the former Wilcox Refinery Site for the EPA in March 1997.
- Site Assessment (SA) was performed at the former Wilcox Refinery Site by EPA in March 1999.
- PA was performed at the former Lorraine Refinery Site by ODEQ in September 2008.
- Site Inspection (SI) was performed at the former Lorraine Refinery Site by ODEQ in August 2009.
- ESI was performed at the former Lorraine Refinery Site by ODEQ in September 2010.
- ESI was performed at the former Wilcox Refinery Site by ODEQ in September 2011.
- Hazard Ranking System Package was completed in May 2013.

In 2014, the EPA ERRS contractor capped and locked an abandoned drinking water well located near the former location of the First Assembly of God Church to the west of the site. ERRS also installed a fence with signage around an oily sludge pit located on a residential property developed within the historical refinery boundary (b) (6).

In 2014 and 2015, WESTON, the EPA Region 6 START contractor, was tasked by EPA Region 6 to perform a Removal Assessment at the Wilcox Oil Refinery site under TDD No. 5/WESTON-042-15-004. Phase 1 was conducted 08 - 11 December 2014, and Phase 2 was conducted 18 May 2015 through 12 June 2015. The field sampling strategy focused on collecting soil samples from

residential properties that have been built on or are in close proximity to the Wilcox Oil Refinery Site.

Prior to initiating the sampling activities in Phase 1, EPA gained access to one targeted residential property ((b) (6)) within the former Wilcox Oil Refinery Site boundary. As part of the assessment activities, the EPA Team collected 187 soil samples (including duplicate QA/QC samples) from a total of 57 grids. Two samples were also taken at the request of the EPA OSC from soil on the bank of an on-site pond and soil that was affected with a tar-like substance from an unknown source.

Prior to initiating Phase 2, EPA gained access to 9 residential properties. The EPA Team collected a total of 240 soil samples (including duplicate QA/QC samples) from a total of 52 grids from 9 properties on and around the Wilcox Oil Refinery Site ((b) (6)). At the direction of the EPA OSC, select locations were pushed to deeper depths to visually investigate the presence of potential refinery waste. Based on historical site operations and historical aerial photographs, selected grids were investigated below 24 inches bgs. These grids were identified on ((b) (6)). The center point of each grid was advanced to a maximum depth of 8 feet bgs or refusal (i.e., bedrock). Visual observations were noted. No analytical samples were collected from these at-depth soil investigation borings.

Results from previous investigations are presented in the EPA START-3 *Wilcox Oil Company Superfund Site Removal Assessment Report*, (TDD No. 5/WESTON-042-15-004) dated January 2016, for results from previous investigations.

2.4 POTENTIAL SOURCES OF HAZARDOUS MATERIALS

Information concerning the known or potential hazardous substance source areas at the site ((b) (6)) and the COCs thought to be associated with each source are presented in the following section. Based on the EPA START-3 Removal Assessment Report, former site activities that contributed to potential sources include the following:

- The Wilcox Refinery
- Lorraine Refinery

- North Tank Farm
- East Tank Farm
- Loading Dock Area

2.5 SITE CONCERNS

The site presents concerns regarding public health and the environment as a result of the following circumstances:

- Surface and subsurface soils contaminated with SVOCs (specifically benzo(a)pyrene) to depths of 24 inches exceeding the removal action level (0.11 mg/kg) established for the site.
- Exposure to hazardous substances could be from ingestion, skin absorption, and inhalation.

The COCs for (b) (6) are SVOCs associated with former refinery operations.

3. SAMPLING APPROACH AND PROCEDURES

The specific field investigation activities that will be conducted during the Wilcox Oil Refinery removal are presented in the following subsections. An overview of sampling activities, along with a discussion of data quality objectives, health and safety protocol, community relations, field activity meetings, and command post establishment are summarized in Subsection 3.1. Subsection 3.2 summarizes grid establishment, post excavation soil sampling, and quality control/quality assurance. Relevant START Standard Operating Procedures (SOPs) for field sampling methods are included in Appendix A.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

Based on historical site data, a sampling strategy was developed to collect data necessary to evaluate and meet the objectives of the removal action. A Proposed Excavation Map is provided as Figure 3-1.

3.1.1 Data Quality Objective

The objective of the removal action is to remove the threat to human health and the environment posed by COCs resulting from historical site operations conducted at the Wilcox Oil Refinery Site at (b) (6). To accomplish this, a data quality objective (DQO) for determining the presence or absence of site-related contaminated soils that are above or below the site-specific action level for this project was developed (Appendix B). This site-specific DQO was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

3.1.2 Health and Safety Plan Implementation

START field activities will be conducted in accordance with a site-specific Health and Safety Plan (HASP) prepared for the Wilcox Oil Refinery removal action. START will coordinate its safety practices and procedures with EPA and ERRS. The HASP specifies that soil sampling activities will proceed in modified Level D personal protective equipment (PPE) including coveralls and/or long-sleeve shirts/pants, safety glasses, disposable gloves, and steel-toed boots. The PTL will act as the FSO and will be responsible for implementation of the HASP during START field activities.

START will be required to conduct work according to the guidelines and requirements of the HASP. In accordance with the START general health and safety operating procedures, the field team will also drive the route to the hospital specified in the HASP prior to initiating sampling activities.

3.1.3 Community Relations

Community relations may require additional EPA involvement due to the general nature of the site. Community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the START PTL, under the guidance of the Scope of Work (SOW) Leader, will manage community relations in the field as directed by the EPA OSC.

3.1.4 Field Activities Review Meeting

START will conduct a meeting with the entire field team to familiarize them with the project scope of work, discuss the planned field activities, roles and responsibilities, and review the project HASP and other relevant operating procedures. This meeting will be conducted prior to any site activities. It is anticipated that EPA, ERRS, and START will conduct daily planning meetings and document overall site activities and progress as necessary.

3.1.5 Mobilization and Command Post Establishment

START will mobilize the equipment required for the removal activities from the WESTON Regional Equipment Store (RES) warehouse located in Houston, Texas, and the EPA Warehouse located in Addison, Texas, as necessary.

3.2 SAMPLING/MONITORING APPROACH

Sampling will be conducted in general accordance with the *EPA Compendium of Emergency Response Team (ERT) Soil Sampling and Surface Geophysics Procedures* and with EPA ERT and START SOPs (Appendix A). WESTON SOPs include SOP No. 0110.01 and 1001.10 (Surface Soil Sampling and Composite Sampling). The specific sampling, decontamination, and sample handling procedures, including disposition of investigation-derived waste (IDW), are described in the following subsections. The following subsections describe the proposed sampling, sample

handling procedures, and field quality control (QC) samples for the removal action activities. The EPA OSC will be notified, and concurrence will be obtained if significant deviations from the planned sampling activities are proposed. Details regarding deviations of the QASP will be documented in the START site logbook.

3.2.1 Post-Excavation Soil Sampling

Upon completion of ERRS excavation activities, START will collect confirmation samples from the 100-foot by 100-foot systematic grids established across the site (Figure 3-1). ERRS will excavate 8 grids to depths ranging from 0 to 24 inches bgs. After ERRS excavation activities, START will collect approximately 10 confirmation soil samples (8 normal and 2 quality assurance samples) from 8 excavated grids.

Each sample will be collected from the bottom of the excavated grid and will consist of a 5-point composite sample. Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. Samples will be collected with dedicated (disposable) plastic scoops. The samples will then be stored in cleaned, unused glass or plastic containers and preserved in a manner appropriate to the analysis to be performed. Sampling personnel will change gloves between each sample collection/handling. The volume of the sample collected will be sufficient to perform the laboratory analysis requested. The composite samples will be placed in appropriate laboratory containers and labeled with appropriate sample nomenclature, and placed immediately on ice, prior to shipment to a laboratory for analysis (following SOP 1101.01 and 1102.01).

Information regarding sample management, sample nomenclature, decontamination, and sample preservation, containers and holding times can be found in Sections 3.3 and 3.4. Information regarding sample analysis and data validation is summarized in Section 4.

3.2.2 Field Quality Control Samples

START will collect field quality control samples as needed during the removal action according to SOPs 1005.01, 1005.02. Quality assurance/quality control (QA/QC) samples will be collected according to the following:

- Blind field duplicate samples will be collected during sample activities for locations selected by the PTL. The data obtained from these samples will be used to ensure the quality assurance of the sampling procedures and laboratory analytical data by following an evaluation of reproducibility of results. Efforts will be made to collect duplicate samples from an area co-located from the original sample location where there is visual evidence of contamination or where contamination is suspected. One duplicate sample will be collected for every 10 samples of the same matrix.
- Matrix Spike (MS)/Matrix Spike Duplicate (MSD) samples will be collected during the sample activities for locations selected by the PTL. The data obtained from these samples will be used to ensure the quality assurance of the sampling procedures and laboratory analytical data by following an evaluation of reproducibility of results. Efforts will be made to collect MS/MSD samples from an area co-located from the original sample location where there is visual evidence of contamination or where contamination is suspected. One MS and one MSD samples will be collected for every 20 samples of the same matrix.
- Temperature blanks will be prepared in the field and will consist of one 40-milliliter glass sample container with Teflon-lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of these samples within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.

3.3 SAMPLE MANAGEMENT

Specific nomenclature that will be used by START will provide a consistent means of facilitating the sampling and overall data management for the project (SOP 0110.05) The START Scope of Work Leader must approve any deviations from the sample nomenclature proposed below.

As stated in SOP 0110.05, sample nomenclature will follow a general format regardless of the type or location of the sample collected. The general nomenclature consists of the following components:

- Property/Site Identification (ID) or Area of Concern
- Grid ID
- Sample Collection Depth
- Collection Type (Soil, Field QC, etc.)
- QA/QC Type (Normal, Duplicate, etc.).

The following presents the sample nomenclature for analytical samples that will generate unique sample names compatible with most data management systems. The sample nomenclature is based upon specific requirements for reporting these results.

SAMPLE NOMENCLATURE - SOIL

Property ID - Grid ID - Depth - Collection Type + QC Type + Date

Where:

Property ID: An identifier used to designate the particular property or Area of Concern (AOC) where the sample was collected.

Grid ID: A two- or three-character alphanumeric code used to designate the particular grid or station within the AOC where the sample was collected.

Depth: A two-digit code used to designate what depth of sample was collected:

06	0 to 6 inches
18	6 to 18 inches
24	18 to 24 inches
48	24 to 48 inches

Collection Type: A one-digit code used to designate what type of sample was collected:

1	Surface Water
2	Groundwater
3	Leachate
4	Field QC/Water Sample
5	Soil

6	Oil
7	Waste
8	Other
9	Drinking Water
0	Sediment

QC Type: A one-digit code used to designate the QC type of the sample:

1	Normal
2	Duplicate
3	Rinsate Blank
4	Trip Blank
5	Field Blank

6	Confirmation
7	Confirmation Duplicate

Date: An identifier used to designate the date of sample collection.

Examples:

- **WOR006-D4-24-170811-56** : Represents a confirmation soil sample collected from Wilcox Oil Refinery (b) (6) from Grid D4 at a depth of 24 inches bgs on August 1, 2017.
- **WOR006-D4-24-170811-57**: Represents the duplicate confirmation soil sample collected from Wilcox Oil Refinery (b) (6) Grid D4 at a depth of 24 inches bgs on August 1, 2017.

Sample data management will be completed utilizing SCRIBE including chain of custody and sample documentation needs.

3.4 DECONTAMINATION

The non-disposable sampling equipment, if any, (hand trowels, stainless steel bowls, Geoprobe coring shoe, etc.) used during the sample collection process will be thoroughly pre-cleaned before initial use, between use, and at the end of the field investigation. Equipment decontamination, as described in SOP 1201.01, will be completed in the following steps:

- Water spray or brush, if needed, to remove soil/sediment from the equipment.
- Nonphosphate detergent and potable water wash to clean the equipment.
- Final potable water rinse.
- Equipment air-dried.

Personnel decontamination procedures will be described in the site-specific HASP that will be prepared by START prior to implementation of activities at the Site. All decontamination activities will be conducted at a temporary decontamination pad that will be constructed/designated in an area to be determined by the PTL.

3.5 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Sample preservation, containers, and holding times utilized during this Removal Action will be consistent with analytical methods and laboratory volume requirements as provided in Table 3-1. Once collected, samples will be stored in coolers and kept at approximately 4° C while at the site and until they are submitted for analysis. Chain-of-custody forms will be completed for each sample shipment and sent with the samples to the designated laboratory. Samples that have been analyzed will be disposed of by the designated laboratory in accordance with the laboratory SOPs.

Table 3-1
Requirements for Containers, Preservation Techniques,
Sample Volumes, and Holding Times
Wilcox Oil Refinery
Bristow, Creek County, Oklahoma

Name	Analytical Methods	Matrix	Container	Preservation	Minimum Volume or Weight	Maximum Holding Time
SVOCs	SW846 8270-SIM	Soil	Glass	4°C	8 oz.	14 days to extraction (soil)/ 40 days after extraction to analysis

4. ANALYTICAL METHODS AND DATA VALIDATION

Soil samples will be submitted to a participating EPA laboratory for analytical analysis. Requested sample analysis will be indicated on the chain-of-custody form and will include the following method:

- SVOCs [benzo(a)pyrene] by EPA SW-846 Method 8270-SIM

Table 4-1 below illustrates the sample description and rationale.

Table 4-1
Sample Description and Rationale
Wilcox Oil Refinery
Wilcox, Creek County, Oklahoma

Sample Location	Sample Collection Method	Sample Depth	No. of Samples ¹	Rationale	EPA Analytical Method
Soil	Disposable Scoop Hand Trowel	24 inches bgs	10	To document the removal of site-specific constituents of concern in subsurface soil	SVOCs – EPA SW-846 Method 8270-SIM

Notes: ¹Soil Samples – 8 Normal and 2 QA/QC samples including field duplicates and MS/MSD samples.

Following analysis, the laboratory will provide preliminary deliverables data via email in PDF. The final data deliverable will include a full Contract Laboratory Program (CLP)-like data package (Level IV data package with QC and raw data) in PDF and a final Electronic Data Deliverable (EDD) in Microsoft Excel format. Initial data deliverables (preliminary results) will be based on a 1-business-day Turn-around Time (TAT), unless otherwise directed by the EPA OSC. The TAT criteria will be initiated when the sample group is received by the laboratory and continues until the data deliverable is submitted to START. The final Level IV data deliverable will be submitted by the laboratory based on a 10-business-day TAT.

START will validate the analytical data generated by the laboratory and provide an evaluation of QA/QC samples for reporting purposes. Data validation will be conducted in accordance with the EPA CLP *National Functional Guidelines for Organic Superfund Data Review – August 2014* (EPA-S40-R-014-002) and *National Functional Guidelines for Inorganic Superfund Data Review – August 2014* (EPA-S40-R-013-001). A summary of the data validation findings will be

presented in Data Validation Summary Reports as part of the final report. The following will be evaluated to verify that the analytical data is within acceptable QA/QC tolerances:

- The completeness of the laboratory reports, verifying that required components of the report are present and that the samples indicated on the accompanying chain of custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of MS/MSD analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision, by reviewing the results for blind field duplicates.
- Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

5. QUALITY ASSURANCE

Quality Assurance (QA) will be conducted in accordance with the WESTON Corporate Quality Management Manual, dated October 2016; the WESTON START Quality Management Plan; and EPA Guidance for Performing Removal Actions under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Following receipt of the TDD from EPA, a Quality Control (QC) officer will be assigned and will monitor work conducted throughout the entire project including reviewing interim report deliverables and field audits. The START PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to the analytical work. START will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

5.1 SAMPLE CHAIN-OF-CUSTODY PROCEDURES

START will utilize SCRIBE for the sample documentation and chain of custody preparation needs. Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, the samples will be maintained under the chain-of-custody procedures. Personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

The chain-of-custody procedures are documented in WESTON SOP 1101.01, and will be made available to personnel involved with the sampling. A typical chain-of-custody record included in SOP 1101.01 will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each of the sample labels and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and the member of the sampling team who originally relinquished the samples will retain another copy. START personnel will complete a chain-of-custody form for all samples sent to a designated off-site laboratory.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- The chain of custody record will accompany samples. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.
- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

SOPs 1101.01 and 1102.01, provided in Appendix A, describe these procedures in more detail.

5.2 PROJECT DOCUMENTATION

Documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, or SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START field personnel while on-site. These modules fall into two basic categories for response and removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, Household Hazardous Waste (HHW), and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes an electronic template that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated Global Positioning System (GPS) unit with the secure electronic template, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping

site. Geographic information system (GIS) personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one site. START personnel will utilize SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

Field Documentation

The following field documentation will be maintained as described below.

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number.
- Names of personnel on-site.
- Dates and times of all entries.
- Description of all site activities, including site entry and exit times.
- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations.
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and chain-of-custody information.
- Records of photographs.
- Site sketches.
- Calibration results.

Sample Labels

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number.
- Date and time the sample was collected.
- Sample preservation method.
- Analysis requested.
- Sampling location.

Chain-of-Custody Record

A chain of custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it.

Custody Seal

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

Photographic Documentation

START will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appears at completion of the work.

Photographs should be taken with either a film camera or digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the

photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

Response Manager

START will use the Response Manager module located on the EPA Web Hub, <https://solutions.westonproject.net/epawebhub/>, to compile and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – site-specific data including location and type of site. It also includes an area for key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Time Line Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for targeted reconnaissance efforts. Typically, the data in this module is associated with Emergency Support Function (ESF)-10 deployments and the cleanup of orphaned containers and hazardous debris, but the module can be utilized for any or all reconnaissance activities.
- Facility Assessment Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for assessments of structures. Typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle-to-grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifests and manifest line items and upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for tracking which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for collection of property data including access

agreements and assessments of the property and current status of property regarding the site removal action.

- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.
- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the EPA OSC in pollution reports (POLREP) or situation reports (SITREP).
- HHW Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta-data associated with that data file can be filled in using the photo log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At any time deemed necessary, POLREP and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and backed up regularly.

5.3 REPORT PREPARATION

At the completion of the project, START will review and validate laboratory data and prepare a draft report of field activities and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.